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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/562,839

12/29/2005

Katsuhiko Nishiwaki

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EXAMINER

WEISS, HOWARD

ART UNIT

PAPER NUMBER

2814

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/562,839	Applicant(s) NISHIWAKI, KATSUHIKO	
	Examiner Howard Weiss	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 March 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 7-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>0108</u> . | 6) <input type="checkbox"/> Other: _____ |

Attorney's Docket Number: 13596/1

Filing Date: 12/29/2005

Continuing Data: 371 of PCT/JP04/08516 (6/10/2004)

Claimed Foreign Priority Date: 7/11/2003 (JPX)

Applicant(s): Nishiwaki

Examiner: Howard Weiss

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 7, 8, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art and Yilmaz et al. (U.S. Patent No. 5,304,831).

Admitted Prior Art Figures 18 to 23 show most aspects of the instant invention including:

- a plurality of active devices arranged on a substrate **910** facing its principle plane
- contact electrodes **909** provided outside the substrate and conducting with the substrate via a contacting portion **908**
- emitter regions **900,904**, body regions **903** and drift regions **902** arranged one on top of each other in this order
- field regions **911** of low impurity concentration, dividing said device into cells and of the same conductive type as a portion (i.e. **900**) of the emitter region
- gate electrodes **906** insulated **907** from said substrate

The Admitted Prior Art does not show a corner of an end portion of the contacting portion of the active device formed with a curve line or obtuse angle and the impurity concentration lower at the corner portion than in the other portion of said contacting

portion. Yilmaz et al. teach (e.g. Figures 5 and 6) to have corners **148a-d** of an end portion of the contacting portion of the active device formed with a curve line or obtuse angle and the impurity concentration lower at the corner portion **160** than in the other portion **158** of said contacting portion to avoid excessive shorting of the channel and improve the breakdown voltage (Column 4 Lines 12 to 40). It would have been obvious to a person of ordinary skill in the art at the time of invention to have corners of an end portion of the contacting portion of the active device formed with a curve line or obtuse angle and the impurity concentration lower at the corner portion than in the other portion of said contacting portion as taught by Yilmaz et al. in the device of the Admitted Prior Art to avoid excessive shorting of the channel and improve the breakdown voltage.

3. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Admitted Prior and Yilmaz et al., as applied to Claim 7 above, and further in view of Kunori et al. (U.S. Patent No. 6,459,128).

The Admitted Prior and Yilmaz et al. show most aspects of the instant invention (Paragraph 2) except for the contacting portion being broader at the end portions than in the central portion. Kunori et al. teach (e.g. Figures 31 and 32) to have a contacting portion being broader at the end portions **81** than in the central portion **82** to provide a device with high withstand voltage, a reduce capacitance and a low conduction resistance (Column 2 Lines 48 to 50). It would have been obvious to a person of ordinary skill in the art at the time of invention to have a contacting portion being broader at the end portions than in the central portion as taught by Kunori et al. in the device of the Admitted Prior and Yilmaz et al. to provide a device with high withstand voltage, a reduce capacitance and a low conduction resistance.

4. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Admitted Prior Art and Murakami (JP 05-090595).

Admitted Prior Art Figures 18 to 23 show most aspects of the instant invention including:

- a plurality of active devices arranged on a substrate **910** facing its principle plane
- contact electrodes **909** provided outside the substrate and conducting with the substrate via a contacting portion **908**
- emitter regions **900,904**, body regions **903** and drift regions **902** arranged one on top of each other in this order
- field regions **911** of low impurity concentration, dividing said device into cells and of the same conductive type as a portion (i.e. **900**) of the emitter region
- gate electrodes **906** insulated **907** from said substrate

The Admitted Prior Art does not show a corner of the contacting portion formed with a curve line or obtuse angle. Murakami teaches (e.g. Figures 1) to have corners **R** of the contacting portion **33** of the active device formed with a curve line or obtuse angle to minimize on-state resistance (see Purpose). It would have been obvious to a person of ordinary skill in the art at the time of invention to have corners **R** of the contacting portion **33** of the active device formed with a curve line or obtuse angle as taught by Murakami in the device of the Admitted Prior Art to minimize on-state resistance.

5. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Admitted Prior and Murakami as applied to Claim 7 above, and further in view of Kunori et al.

The Admitted Prior and Murakami show most aspects of the instant invention (Paragraph 4) except for the contacting portion being broader at the end portions than in the central portion. Kunori et al. teach (e.g. Figures 31 and 32) to have a contacting portion being broader at the end portions **81** than in the central portion **82** to provide a device with high withstand voltage, a reduce capacitance and a low conduction resistance (Column 2 Lines 48 to 50). It would have been obvious to a

person of ordinary skill in the art at the time of invention to have a contacting portion being broader at the end portions than in the central portion as taught by Kunori et al. in the device of the Admitted Prior and Murakami to provide a device with high withstand voltage, a reduce capacitance and a low conduction resistance.

Response to Arguments

6. Applicant's arguments filed 3/21/2008 have been fully considered but they are not persuasive. The Applicant states that the feature of Yilmaz et al. that show the corner regions at an angle is a diffusion region not a contact portion. However, the shape of the corner regions is propagated to the contact region as depicted by the solid lines in Figure 5 and corresponds to the portion of the contact region labeled **152** in Figure 6. The motivation to make the corner regions with the shape depicted (to provide a device with high withstand voltage, a reduce capacitance and a low conduction resistance) would be relevant to the formation of the contact portion. Additionally, one of ordinary skill in the art would consider the entire region including **160** as the contact portion even though only a portion would be in contact with an interconnection layer. In this respect, **159** would be at a higher impurity concentration than the outer region **160**. In reference to the reasons given in the prior art not being obvious or common sense, it is not for the Examiner to question the motivation given in the prior art is the motivation is relevant to the device being considered. A clearer description of what is the problem with the motivation in the prior art must be stated by the Applicant.

In reference to the feature in Konori not being a contact region, Figure 31 clearly shows electrode **44** in contact with areas **81, 82**. It would have been obvious to a person of ordinary skill in the art at the time of invention

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

8. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(571) 273-8300**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Howard Weiss at **(571) 272-1720** and between the hours of 7:00 AM to 3:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via Howard.Weiss@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on **(571) 272-1705**.

10. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at **866-217-9197** (toll-free).

11. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass(es): 257/ 341	thru 6/26/2008
Other Documentation: none	
Electronic Database(s): EAST	thru 6/26/2008

HW/hw
3 July 2008

/Howard Weiss/
Primary Examiner
Art Unit 2814